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ABSTRACT

Sharing behaviors of infants who had experienced early separation through hospitalization from their mothers were compared to behaviors of infants who had experienced no such separation. Responses of the mothers to their infants' prosocial behavior were also analyzed. Subjects were twenty 1-year-old infants and their mothers. On the basis of the infants' neonatal history each pair was assigned to one of two groups: Intensive Care Nursery (ICN) group and non-ICN group. After completing the Bayley Mental Scale, mother-infant pairs were seated in an observation room in which four toys were arranged on the floor. A videotape of each pair was scored for the frequency of seven infant behaviors: pointing to toys in the room: showing toys to mother: bringing toys to mother: giving toys to mother: playing with toys in mother's lap or hands: vocalizing to mother while playing with a toy: and smiling at mother while playing with a toy. Three maternal behaviors were scored: vocal responses to infant behaviors: physical responses to infant behaviors: and posture. Examination of the data indicated that ICN infants displayed sharing behaviors less frequently than non-ICN infants. ICN infants exhibited fewer proximal behaviors (such as giving) than non-ICN infants. However, the more distal behaviors (such as pointing, vocalizing) were equally frequent in the two groups. Mothers of ICN infants were not as responsive to their children's behaviors as were non-ICN mothers. (Author/JA)

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The Effects of Early Mother-Infant Separation Upon Sharing Behaviors of One-Year-Olds

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For many years, investigators in pediatrics, psychology, and psychiatry have been concerned with the factors that influence mother-infant attachment. Even within the first few days of life, early mother-infant separation has been reported to adversely affect the development of attachment between mother and infant.

In current neonatal practice, there are several situations in which the mother and infant are separated shortly after birth; for example, when the infant is admitted to an intensive care nursery. The developmental prognosis for such infants is highly dependent upon the quality of caretaking within the environment in which they are reared (Sameroff & Chandler, 1975). Research (Barnett, Leiderman, Grobstein, & Klaus, 1970; DiVitto & Goldberg, 1979; Seashore, Leifer, Barnett, & Leiderman, 1973) has shown that mothers who have experienced early post-partum separation, such as that necessitated by the hospitalization of the infant in an intensive care nursery, may demonstrate less effective involvement with their infants, less confidence in their interactions with the infant, and less skillful caregiving behaviors than mothers who have not experienced separation. Such mothers may not be altogether in tune with their babies' needs and may, therefore, interact with their infants in ways that do not foster their children's maximal social-emotional development.

The development of social behaviors of children under two years of age is often measured by examining prosocial behaviors, such as sharing (Mussen & Eisenberg-Berg, 1977). In infancy, sharing is usually defined as the spontaneous pointing to, showing of, or giving of an object to another person, usually an adult, or the infant's manipulation of the object in the adult's hands or lap. Rheingold and her associates (Rheingold, 1973, 1977; Rheingold, Hay, & West, 1976) discovered such sharing behaviors with children between 12- and 18-months of age. Incidental observations have detected the antecedents of sharing, such as pointing to objects, as early as 9 months in normal infants. Rheingold (1973) suggests that by sharing the infant makes the mother a "partner in his activities by taking the initiative to include her in his discovery and manipulation of toys and in his pleasure."

Using procedures similar to Rheingold's, Cotton (1976) replicated Rheingold's findings and suggested that, not only do sharing behaviors reflect the infant's need to explore and be independent, but they may also provide an index of the nature or degree of maternal-infant attachment. Other researchers (Mussen & Eisenberg-Berg, 1977) have hypothesized a relationship between the components of attachment, such as maternal nurturance and effective caretaking, and the later appearance of prosocial behaviors of the infant. The predisposition toward prosocial behavior may be influenced through the modeling of such behaviors during the performance of nurturing childrearing practices. Since early mother-infant separation is thought to adversely affect the attachment of the pair, it is reasonable to think that separation may disrupt the development of sharing behavior. To date, these propositions have not been thoroughly investigated.

The objectives of the present study were to examine the sharing behaviors of infants who were separated from their mothers for the first few weeks after birth due to placement in an intensive care nursery; second, to compare their behaviors to those of infants who experienced no such separation, and were taken home by their mothers after the usual 3-5-day interval following birth; and, third, to analyze the responses of the two groups of mothers to the prosocial behaviors of their infants. Moreover, the present study extends the focus of the previous separation research from the medical, cognitive, and physical aspects of the development of the child to the social and emotional development of the child, which is certainly affected by maternal interaction and attachment.

Subjects were 28 one-year-old mother-infant pairs: 14 comprising the Intensive Care Nursery (ICN) group and 14 comprising the Non-ICN group. The characteristics of each subject group are shown in Table 1. The composition of the two groups was relatively comparable in gender and race. The evaluations were scheduled to equate both groups on post-conceptual age at the time of observation, which corrected for the prematurity of the ICN group on the Bayley Mental Scale and Vineland Social Maturity Scale measures. Infants in the ICN group had been separated from their mothers due to mild neonatal complications, such as respiratory distress syndrome, which were associated with prematurity and/or low birth weight. The ICN infants also met the following criteria: birth weight not less than 1350 grams; gestation time not less than 32 weeks; minimum of one week in the ICN; Bayley Mental Scale age equivalent between 11 and 14 months, and the ability to locomote independently. Non-ICN infants met the same criteria with the exceptions of the ICN experience and birth weight; no infants with a birth weight less than 2500 gm. were used. The Non-ICN infants had

uncomplicated neonatal histories and experienced no separation from their mothers. With the exception of the characteristics used to identify the ICN group (chronological age, gestation time, and birth weight), no significant differences were found between the two groups on any of the subject characteristics presented in Table 1. A medical exam concurrent with our observation revealed no abnormalities for the ICN infants.

Each mother-infant pair was tested in a clinic setting, and following the explanation and consent procedures, the Bayley Mental Scale and the Vineland Social Maturity Scale were administered. The mother and the infant were then taken into a white, 12' x 12' carpeted observation room containing only one chair which was placed in a corner. Two pictures were hung on the walls of the room and a mobile was suspended from the ceiling. The mother was seated in the chair and instructed to remain seated and to be relatively inactive. The mother was allowed to respond to her child's behaviors by minimal smiling, vocalizations or nods depending upon her style. The infant was placed in front of the mother facing an array of four toys arranged in a predetermined order approximately five feet from the infant. The toys, a telephone, milk-carrier, baby clutch ball and blocks, were the same as those used by Rheingold and Cotton. The toys were selected for their appeal to 1-year-olds and the frequency of sharing responses they elicited.

Each session was 10 minutes long and was videotaped through a one-way mirror. Each videotape was coded independently by two pairs of trained observers who were naive to the purpose, design and procedures of the study. The following six infant behaviors were coded: pointing to toys or objects (e.g., mobile pictures in the room, showing toys to mother, bringing toys to

mother, giving toys to mother, playing with toys in mother's hands or lap, and vocalizing to mother while actively contacting a toy. Three maternal behaviors were also scored: vocal responses to the infant's behaviors--e.g., "thank you" or vocally acknowledging an infant behavior, physical responses to the infant's behaviors--e.g., accepting a toy and nodding, and posture, either closed (arms or legs crossed close to the body decreasing the child's access to the mother) or open (arms and legs loosely positioned, making mother accessible to the child). Inter-observer agreement was calculated for each behavior of each subject, and across all subjects, the mean percentage of agreement for each behavior ranged from 97-100%.

The mean frequencies of each sharing behavior for the ICN and Non-ICN infant groups are shown in Table 2. These data suggest that the Non-ICN group displayed more sharing behaviors (15.07) than did the ICN groups (9.07). All infants in both groups exhibited at least one sharing behavior. Because we felt that the two groups of infants would be more similar in their frequencies for distal sharing behaviors (pointing, showing, vocalizing) than in their frequencies for the more proximal behaviors (bringing, giving, playing), we decided to analyze these two groups of behaviors separately. All fourteen infants in each group showed at least one distal sharing behavior. A multivariate analysis (Hotelling's T^2) was performed upon the three distal sharing behaviors and revealed no significant differences between groups. Thus, the ICN and Non-ICN infants both displayed equivalent levels of distal sharing behaviors.

Six ICN infants and nine Non-ICN infants exhibited at least one proximal sharing behavior. A second multivariate analysis (Hotelling's T^2) was executed for the proximal sharing behaviors and resulted in a marginally significant difference between groups, $F(3, 24) = 2.69$, $p < .069$. Examination

of the univariate analyses indicated that the ICN infants exhibited fewer giving behaviors (.29) than did the Non-ICN group (1.79), $F(1, 26) = 7.70$, $p < .01$. The univariate analysis of the bringing behaviors approached significance, $F(1, 26) = 3.01$, $p < .10$, suggesting that there was a trend toward fewer bringing responses for the ICN groups than for Non-ICNs. Thus, there was a tendency for the Non-ICN infants to display more proximal sharing behaviors than the ICN infants.

Pearson product-moment correlations were computed between the sharing behaviors (proximal, distal, total) and the subject characteristics shown in Table 1 for all infants and separately for each group. None of these correlations were significant, indicating that differences in sharing behaviors between the ICN and Non-ICN groups were not attributable to differences in subject characteristics, such as birth weight or socioeconomic level.

The mean maternal responses to infant sharing behaviors for each group are shown in the lower portion of Table 2. These data suggest that the Non-ICN mothers (16.71) were more responsive to their infants than were the ICN mothers (8.50). A multivariate analysis (Hotelling's T^2) of these data revealed a significant difference between the two groups, $F(3, 24) = 9.97$, $p < .001$. Univariate analyses indicated that mothers in the Non-ICN group were more physically responsive to their infants (1.79) than the ICN mothers (.43), $F(1, 26) = 6.47$, $p < .017$. Non-ICN mothers also displayed more open postures (9.43) than did the ICN mothers (4.86), $F(1, 26) = 18.19$, $p < .001$. Thus, ICN mothers were less approachable and less physically responsive to their infants than were the Non-ICN mothers.

Correlation coefficients were calculated for the maternal responses and the subject characteristics shown in Table 1. These coefficients were all nonsignificant, suggesting that the differences between the behaviors of the

mothers in the two groups could not be attributed to such characteristics as socioeconomic level or the number of years of education of the mother. Responses of the mothers were also correlated with infant sharing behaviors and the pattern of these suggested that the infants who shared more had more responsive mothers (e.g., total sharing vs. mother's responses, $r = .44$, $p < .05$). One pair of interesting correlations were between infant's giving and mother's physical responses for the ICN ($r = .48$, ns) and Non-ICN groups ($r = .98$, $p < .01$). These correlations indicated that Non-ICN mothers took a toy from their infants almost every time the infants gave them a toy, but the ICN mothers did not.

The results of the present study are consistent with research demonstrating that ICN mothers are less physically interactive with their infants (Di Vitto & Goldberg, 1979). These mothers may initially perceive their infants to be smaller, more fragile, and less healthly than non-ICN infants, and they may also be less prepared for parenting than the mothers of full-term non-ICN infants. Furthermore, mothers of ICN infants may be intimidated by the array of medical equipment and trained personnel surrounding their infants. The immediate postpartum experiences and perceptions of the ICN mothers may lead them to develop feelings of inadequacy, less competent caregiving behaviors, and less skillful social interactions with their infants.

Intensive care nurseries probably do little to foster the mother-infant interaction and may, in fact, hinder it by providing little opportunity to practice interactive skills. The ICN mothers and infants are likely to be less adept social partners because they have less experience in learning to read, predict, or recognize salient features of the other's behavior (Goldberg, 1979). Usually, in a dyadic interaction in which one member of the dyad has limited competence, the interaction may continue to function if the more proficient member

can compensate for the inadequate social skills of the other member. In a parent-infant-dyad, the parent must assume the responsibility of compensating for the infant's deficits in social skills because the infant's behavioral repertoire and flexibility are rather limited. With an ICN infant-mother pair, the imbalance in social skills may be extreme and may unduly stress the mother-infant interaction.

Many of the infant's social skills and behaviors are products of his interactions with the salient adults in his environment. Sharing is one of the earlier developing prosocial behaviors of the infant which may be affected by the quantity and style of the parent-infant interaction. The findings of the present study suggest that early mother-infant separation may have lasting effects upon the interaction between mothers and their infants. ICN infants displayed fewer prosocial sharing behaviors than non-ICN infants, and ICN mothers were less responsive than non-ICN mothers to the prosocial behaviors of their infants. Furthermore, ICN infants seemed to be less capable than non-ICN infants of eliciting maternal responses. Our data indicate that the interactional differences between ICN and non-ICN mother-infant pairs cannot be attributed to differences in the groups' socioeconomic levels, intellectual functioning, or other measured subject variables.

The present study suggests that the developmental course of other prosocial behaviors, such as helping, comforting, or cooperating, should be investigated with ICN mother-infant pairs to see whether these prosocial behaviors are also affected by the separation of mother and infant during the ICN experience. While the question still remains as to whether the deficits in prosocial behaviors of the ICN group will continue to be found at older age levels, the relationship between early mother-infant separation and the development of sharing behaviors at one year of age has been demonstrated.

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Table 1

Characteristics of Subject Groups

	Intensive Care Nursery Group (ICN) (N=14 mother-infant pairs)*	Comparison Group (Non-ICN) (N=14 mother-infant pairs)**
Chronological Age at time of study	13.2 months	12.3 months, $p < .003$
Gestation time	34.4 weeks	40 weeks, $p < .001$
Birth weight	2441.4 grams	2956.2 grams, $p < .02$
Length of stay in ICN	20.3 days	---
Bayley Mental Scale age equivalent	12.5 months	12.8 months
Vineland Social Maturity Scale age equivalent	1.1 years	1.2 years
Maternal age at birth of child	25.1 years	24.7 years
Mother's years of education	12.4 years	13.2 years
Estimated socioeconomic status using Hollingshead & Redlich Occupational Scale (Range 1-7, 4 is medium-status level)	4.3 level	4.1 level
Marital status	10 married, 4 single	10 married, 4 single

*8 males (6 White, 2 Black), 6 females (6 White)
**7 males (4 White, 3 Black), 7 females (6 White, 1 Black)

Table 2

Mean Infant and Maternal Behaviors for the

ICN and Non-ICN Groups

	ICN Group	Non-ICN Group	
Infant behaviors			
Proximal sharing behaviors	1.14	3.57	$p < .06$
Bringing a toy to mother	.71	1.64	
Giving a toy to mother	.29	1.79	$p < .01$
Playing with a toy in mother's hands or lap	0	.14	
Distal sharing behaviors	7.93	11.50	
Pointing to toys or objects	.93	1.14	
Showing toys to mother	1.35	1.85	
Vocalizing to mother while actively contacting toy	5.64	8.50	
Total sharing behaviors	9.07	15.07	
Maternal behaviors			
Vocal responses to infant behaviors	3.21	5.50	
Physical responses to infant	.43	1.79	$p < .02$
Open posture	4.86	9.43	$p < .001$
Total responses of mother	8.50	16.71	$p < .001$